

The Risk Analysis of Musculoskeletal Disorders in Pottery Making Workers in Kasongan, Bantul

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ABSTRACT

Musculoskeletal problems are problematic in Indonesia because manual work activities such as lifting, transporting, pulling and pushing are still being done. Those can cause skeletal muscle disorders. Pottery-making workers in the Bantongan Kasongan Tourism Village are still doing those moves traditionally such as lifting, transporting, pulling and pushing manually. If done repeatedly and over a long time, they can cause occupational diseases, such as musculoskeletal disorders (MSDs). The purpose of this study was to analyze the risk of MSDs in the pottery making workers in Kasongan. This research is an analytic observational with cross sectional design. The population in this study were 270 pottery making workers in Kasongan Tourism Village, Bantul Regency. Based on the theory, the sample amounted to 78 workers selected using accidental sampling techniques. The instruments used in this study were the Nordic Body Map (NBM) questionnaire and the Rapid Entire Body Assessment (REBA). Data analysis was performed using the chi fisher test. The results showed that the variables associated with MSDs complaints were age (sig= 0.000) and variables that had no relationship with MSDs complaints were gender (sig= 0.341) and work posture (sig= 0.352). The risk factor associated with complaints of MSDs is age, so to reduce the risk of the occurrence of MSDs in workers, they can do physical activity or stretch muscles.

Keywords : Gender, Musculoskeletal, Age, Work Posture.

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BACKGROUND

Problems in occupational health and safety are serious global problems faced by every country in the world. In 2003, the International Labor Organization (ILO) noted that the most common occupational diseases (PAK) in the world had shifted from occupational lung diseases and Noise Induced Hearing Loss (NIHL) to Musculoskeletal Disorders (MSDs), NIHL, lung diseases, psychological disorders and cancer (Kurniawidjaja, 2020).

Ministry of Health's R&D results in 2005 on "Profile of Workers' Health Problems in Indonesia" showed that 40.5% of workers complained of work-related problems, namely skeletal muscle disease (16%), cardiovascular (8%), neurological disorders (6%). Skeletal muscle problems are still a problem in Indonesia because manual work activities such as lifting, transporting, pulling, and pushing are still being done (Kurniawidjaja, 2020).

The work process that is not ergonomic is one of the causes of most cases of occupational diseases (International Labour Organization. *Tren Ketenagakerjaan dan Sosial di Indonesia*, 2014). One of the occupational diseases caused by non-ergonomic work processes is MSDs complaints. Complaints about MSDs related to work are disorders that occur in body structures such as muscles, joints, tendons, ligaments, nerves, bones and local circulatory system, which are caused by work factors (Tarwaka, 2016).

Complaints MSDs are complaints that are in the skeletal or skeletal muscles that are felt by someone ranging from complaints from very mild to very sick. If the muscle receives a static load repeatedly and over a long period of time, then it can cause complaints in the form of damage to the joints, ligaments or tendons. Factors causing MSDs complaints are excessive muscle stretching, repetitive activity of unnatural work attitudes, secondary causes and combination causes (Tarwaka, 2014).

The results show that workers who experience MSDs disorders are because they have work attitudes that are not ergonomic and this is a major influencing factor (Pratama, 2017). Un Ergonomic work attitudes which are carried out statically and repeatedly with the support of erratic rest periods and age of workers are the triggers for MSDs complaints (Sari, 2017). Body posture when working in accordance with the natural work posture means that there is an adjustment to the anatomy of the body so that no pressure is placed on the tendons, bones, nerves or other body organs. If this is done the worker will relax so that it can minimize the occurrence of MSDs complaints (Evadarianto, 2017).

Kasongan Tourism Village has a lot of workers or pottery making, which in the process of making pottery is still done traditionally by hand or manually such as lifting, transporting, pushing, and pulling. This if left too long can cause occupational diseases, namely MSDs. With this working condition, the researcher is interested in examining the risk of Musculoskeletal Disorders (MSDs) in earthenware workers in Kasongan Tourism Village, Bantul Regency. The study was conducted using the Rapid Entire Body Assessment (REBA) method to determine the awkward postures of pottery craftsmen and to use the Nordic Body Map (NMB) method for complaints of MSDs on pottery craftsmen. The application of ergonomics is expected to increase work productivity. Therefore, it is necessary to control the risks arising from ergonomic hazards by conducting an assessment to find out how much the risk of ergonomics in workers and to know the frequency of work at risk of musculoskeletal disorders in workers.

METHODS

This research is an analytic observational with cross sectional approach. This research was conducted in May-June 2018. The population of this study was all workers in pottery making in Kasongan Tourism Village, Bantul Regency, as many as 270 people. The

sample used in this study was determined using a large cross sectional sample formula of 78 people. The sampling technique is accidental sampling technique. This study uses a research instrument in the form of a Nordic Body Map (NBM) questionnaire, Rapid Entire Body Assessment (REBA), and uses a mobile camera. Analysis of the data used is univariate and bivariate analysis. Bivariate analysis was performed using the Fisher test.

RESULTS

1. Characteristics of Respondents

The number of respondents in this study was 78 respondents with the characteristics of respondents based on age and gender can be seen in table 1.

Table 1. Characteristics of Respondents by Age and Gender of Pottery Making Workers in Kasongan Tourism Village, Bantul

Variable	n	%
Age		
≥ 35 years	74	94.9
< 35 years	4	5.1
Gender		
Male	37	47.4
Female	41	52.6
Total	78	100

Based on the results of table 1 above, it can be seen that the characteristics of respondents based on age indicate that overall, some of them are over 35 years old, namely 74 respondents (94.4%). The results of the characteristics of respondents by sex showed that the number of respondents who were female was greater, namely 41 respondents (52.6%) compared to the number of male respondents which amounted to 37 respondents (47.4%).

2. Factors Associated with Complaints of Musculoskeletal Disorders (MSDs)

The results of the statistical analysis with the alternative fisher test between age, sex and body posture with MSDs complaints on earthenware vessel workers in Kasongan Tourism Village, Bantul Regency can be seen in table 2 below:

Table 2. Age Distribution with MSDs Complaints in Pottery Making Workers in Kasongan Tourism Village, Bantul.

Variable	MSDs Complaints				Sig	RP (95%CI)
	MSDs		Non MSDs			
	n	%	n	%		
Age						
Risky	73	98.6	1	25.0	0.000	3.946 (0.723-21.548)
Not Risky	1	1.4	3	75.0		
Gender						
Female	40	54.1	1	25,0	0.341	1.062 (0.954-1.182)
Male	34	45.9	3	75,0		
Work Posture						
High	39	52.7	1	25.0	0.352	1.059

Low	35	47.3	3	75.0	(0.953-1.176)
Total	74	100	4	100	

Based on table 2 above, the results of the bivariate analysis in table 2 show that workers who have MSD complaints include those who are at risk (≥ 35 years old), as many as 73 workers (98.6%) and those who have no risk age are 1 worker (1.4%). Statistical analysis results show that the $\text{sig} = 0.000 (< \alpha (0.05))$ which means that there is a statistical relationship between age and MSDs complaints on earthenware vessel workers in Kasongan Tourism Village, Bantul Regency. Risk Prevalence (RP)= 3.946 with 95% CI (0.723-21.546) which means that age is not necessarily a risk factor for MSDs complaints.

Workers who had complaints of MSDs consisted of 40 female workers (54.1%) and 34 male workers (34%). The results of statistical analysis revealed that the value of $\text{sig} = 0.341 (> \alpha (0.05))$ which means there is no statistical relationship between age and MSDs complaints on earthenware workers in the Kasongan Tourism Village, Bantul Regency. Risk Prevalence (RP)= 1,062 with 95% CI (0.954-1.182) which means gender is not necessarily a risk factor for MSDs complaints.

Workers who have complaints of MSDs include having a high level of body posture which is 39 workers (52.7%) and who have low body posture of 35 workers (47.3%). The results of statistical analysis revealed that the value of $\text{sig} = 0.352 (> \alpha (0.05))$ which means that there is no statistical relationship between body posture with complaints of MSDs in earthenware workers in the Kasongan Tourism Village of Bantul Regency. Risk Prevalence (RP)= 1.059 with CI 95% (0.953-1.176) which means that posture is not necessarily a risk factor for MSDs complaints

DISCUSSION

1. Relationship between workers in pottery making and complaints of Musculoskeletal Disorders (MSDs)

The results of this study stated that age was associated with complaints of MSDs in pottery craftsmen workers in Kasongan, Bantul Regency. Age is closely related to MSDs complaints (Manengkey et al, 2016). These results are in line with previous studies that less than 35 years of age have a smaller risk of complaints of Musculoskeletal Disorders (MSDs) compared to ages over 35 years and have a relationship with complaints of MSDs (Jalajuwita, 2015).

In this study, it is known that 73% of pottery craftsmen workers in Kasongan are aged over 35 years where people at that age have a risk of complaints against MSDs. This is because in general pottery-making workers have started making pottery since their teens, so that when researchers conducted data collection the results obtained by the majority were over 35 years old. Increasing age is directly proportional to the occurrence of bone degeneration in the form of tissue damage or reduction in fluid so that it can cause reduced muscle stability. The older a person is, the higher the person's risk of decreasing elasticity in the bones which triggers MSDs symptoms. The decrease in physical strength is very influential on the work done, in this case is making pottery which is more physical activity using the muscle strength of workers. People older than 30 years are more prone to experiencing MSDs complaints. The older the worker age, the less muscle strength. Moreover, supported by an increase in work, they will have a big risk for MSDs complaints (Sari, 2017).

The results of this study are reinforced by previous research which states that there is a relationship between age and MSDs complaints and is a risk factor for MSDs complaints. Workers aged > 30 years have a risk of 4.4 times to experience MSDs complaints compared to workers aged <30 years (Agustin, 2012). Complaints occur because in general complaints from the skeletal muscles begin to be felt at work age, which is 25-65 years. The first complaint is usually felt at the age of 35 years and the level of complaints will increase with age (Tarwaka, 2016).

2. The relationship between the gender of pottery making workers and complaints of Musculoskeletal Disorders (MSDs)

The results showed that gender has no relationship to MSDs in pottery craftsmen workers in Kasongan, Bantul. Based on the results of the study, it is known that more pottery workers are female, out of 41 female respondents, 40 of them experience MSDs complaints. Thus, it can be concluded that men and women have the same risk for MSDs complaints. There is no difference between men and women in relation to the risk of MSDs complaints, it really depends on the type, activity and workload carried out by workers (Shobur, 2019).

The absence of a relationship is due to another factor, namely years of service. Pottery-making workers in Kasongan Tourism Village have a long enough working period, the average pottery-making worker has worked for more than 10 years. With a long working period, workers making pottery know better in responding to complaints due to work such as complaints of MSDs so that in this study there was no relationship between sex with MSDs complaints.

Workers with long periods of work and activities that tend to be monotonous will be more at risk for experiencing physical fatigue that will result in injury (Helmina, 2019). The longer the worker performs the same activity, the more he is aware of the risk of MSDs risk, this is because MSDs are a chronic disease that takes a long time to manifest (Shobur, 2019).

But the results of this study differ from Tarwaka's theory which states that physiologically, the ability of male muscles is greater than that of women, the ratio between male and female muscles is 3: 1. Physiologically, people who have lower physical strength, if doing work that requires exertion, will be more vulnerable to the risk of muscle injury.

3. The relationship between the work posture of pottery making workers and musculoskeletal disorders (MSDs) complaints

The results show that there is no relationship between work posture and MSDs complaints. This can be caused by earthenware workers stretching the body while working if they feel tension in the body. Relaxation between 5-10 minutes and stretching of the body gives workers a sense of comfort so as to reduce the risk of MSDs complaints (Icsal, 2016). Muscle stretching exercises can reduce the incidence of MSDs complaints in workers, workers feel comfortable and feel lighter, fresher and complaints of reduced muscle pain (Nunik, 2015).

Pottery-making workers do not always work eight hours a day because each process requires its own time, so that if one part of the pottery-making process is complete, workers can rest immediately so they have sufficient rest time and have a good recovery period and can start working with fit body state. This is confirmed by previous research which states that MSDs complaints to workers are more common in

workers who do little physical activity and who have a rest period of less than 7 hours (Istighfaniar, 2016).

Workers should work naturally so as to minimize the occurrence of MSDs injuries. Good posture is determined by the movement of body organs at work. The farther the position of the body from the center of gravity, the higher the skeletal muscle complaints occur. Unnatural work attitude is due to incompatibility of work with the ability of workers (Tarwaka, 2016).

CONCLUSION

A factor related to MSDs complaints on pottery making workers in Kasongan is age, while factors that are not related to MSDs complaints on the workers in Kasongan are gender and work posture. Workers can stretch muscles while working in accordance with the guidelines for a healthy lifestyle community movement.

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